Patient-Centered Care Model's Effectiveness in Reducing Patient Waiting Time in the Emergency Department: A Systematic Literature Review

Anod Alhabib[a, b]   Maram Almutairi[b, c]   Heba Alqurashi[b]

[a]Nursing, Johns Hopkins Aramco Healthcare, Dhahran, Saudi Arabia; [b]Public Health Department, College of Health Scienes, Saudi Electronic University, Dammam, Saudi Arabia; [c]Quality and Patient Safety, Johns Hopkins Aramco Healthcare, Dhahran, Saudi Arabia

Abstract

Introduction: The emergency department (ED) is an essential component of any hospital that offers round-the-clock urgent treatment to patients in critical condition. However, lengthy waiting times are expected, which may negatively affect the patient's health and overall experiences. This systematic review aims to assess the effectiveness of patient-centered care (PCC) models in reducing the time patients spend waiting in the emergency room by synthesizing the available evidence. This was conducted by following the following three research objectives: (i) to identify patient-centered care models implementation in hospital settings, (ii) to assess the effectiveness of patient-centered care models in improving patient outcomes in hospital settings, and(iii) to investigate the impact of prolonged waiting time on healthcare utilization in the ED. ***Methods:*** In this systematic review design to be included, an article had to be: full text, in English, peer-reviewed, address the evaluation of the effectiveness of the PCC model in reducing ED wait times, and the ED. Studies were excluded if they were abstracts, not fully available, published in any language other than English, were not peer-reviewed, did not meet the date of search, and were systematic reviews. The study was conducted by computerized databases which included PubMed, MEDLINE, Embase, Scopus, Web of Science, and CINHAL were searched between April 1, 2023–April 17, 2023. The study used the updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement which has been updated to PRISMA 2020, a reporting guideline designed to address the issue of inadequate systematic review reporting. All the articles that satisfied the predefined inclusion criteria were independently assessed for risk of bias by two independent reviewer. ***Results:*** A systematic review design searched the literature on ED context with PCC as the intervention to reduce the waiting time. Two independent reviewers screened the articles (3,114) using the PRISMA and 27 articles were included. ***Conclusion:*** Long waiting times resulted in many adverse events for patients, such as delayed treatment and poorer clinical outcomes. PCC can exert a very impressive role contribution to EDs as patients should be integrated with health care providers in their health issues and treated from all perspectives.

© 2024 The Author(s).
Published by S. Karger AG, Basel

Corresponding Author:
Maram Almutairi, Maram.AlMutairi@JHAH.COM

Introduction

Overcrowding in the emergency department (ED) is a major public health and patient safety concern due to the millions of patients worldwide seeking emergency care on an annual basis. The issue stems from a gap between public demand and available physical, human, and institutional resources. Overcrowding in EDs threatens patient safety and public health by jeopardizing patient care and the overall reliability of the emergency care system.

Waiting times put patients at risk for deteriorating prognoses, longer than necessary hospital stays, substandard care, and death [1]. Also, patients who remain in the ED for long times tend to face greater financial costs and report lower satisfaction with their quality of care [2, 3]. Increasing healthcare utilization results in exorbitant direct and indirect expenses for both the patient and the healthcare system. Costs are rising as a result of cyclical use of inpatient and ED services due to delayed diagnosis and a lack of access to therapy. As a result, the quality of care decreases and adverse outcomes may demand further medical interventions and resources, boosting expenses even more [4]. Prolonged LOS in the ED is also linked to higher hospitalization, hospital-acquired pressure ulcers, prescription mistakes, and death. These factors influence costs by potentially increasing expenditures due to increased length of stay (LOS), as well as concerns for patient safety [5].

Traditional ED quality development initiatives typically center their attention on structures, processes, and outcomes, such as the average length of time a patient is kept waiting, the proportion of patients discharged without being seen by a doctor, and the number of patients treated at any given time. Although these factors should be considered to develop a superior ED that improves the health system, it is essential to recognize how patients experience their care. It is of the utmost importance to ensure that patients are discharged from the ED with a sense of contentment regarding the level of care they have received and the quality and individualization of the requested services [6]. Several strategies for overcoming this problem have been demonstrated, including demand management and the implementation of system-wide process objectives such as the "4-h rule," "fast-tracking," "enhanced triage," and "overlapping shifts," as well as new models of care such as the introduction of nurse practitioners and physician assist triage aimed at increasing input [7].

Among the potential solutions that are receiving a lot of attention is the patient-centered care (PCC) model which focuses on patients first and foremost [8]. Although PCC has become increasingly important across a variety of healthcare contexts, emergency medicine must still reevaluate its approach to incorporate this priority into its practice.

According to the Institute of Medicine (IOM), patient-centered care is the delivery of medical treatment that recognizes and addresses each patient's specific preferences and requirements while ensuring that the patient's values are the guiding principle for all therapeutic decisions. Patient-centered care in emergency care maintains and responds to the demands and needs of patients and their families; a willingness to participate in and assist decisions regarding the care they receive; to continue being educated and well-informed about their care; to communicate with their care healthcare professionals; confidentiality; comfort; and expectations [9].

PCC techniques interact with patients holistically by integrating various aspects of care, including medical, psychological, and social dimensions. By focusing on individualized care, shared decision-making, and building a strong therapeutic alliance, PCC ensures that the broader context of the patient's life is considered, leading to more effective and comprehensive care delivery [10]. PCC was introduced and investigated in a wide variety of areas of healthcare, including but not limited to nursing, cancer care, pediatrics, long-term care, mental health, primary care, and other related disciplines. To guarantee that PCC is meaningfully practiced, it requires efforts on all levels, including the patient, the provider, and the healthcare system [6].

Patient-centered care can be evaluated based on how well it meets three main criteria: patient satisfaction, patient engagement, and personalized treatment. Patient satisfaction is the most apparent indicator as it incorporates both domains mentioned earlier, and in certain respects, it encompasses each of the six quality pillars as well (effective, timely, efficient, safe, patient-centered, and equitable) [9].

Engagement is the second aspect of PCC; it focuses on the decision-making processes that consider patients' preferences and beliefs. Third, personalized treatment, where patient's care is tailored to individual patients' requirements.

This research conducted a systematic literature review on PCC models and assessed the effectiveness of these models in reducing emergency room waiting times by synthesizing the available evidence, and this study will shed light on the efficacy of patient-centered care models and their potential to improve ED treatment outcomes.

Table 1. Sample search strategy

#	Database name	Search dates	Number of articles found	Number of articles included
1	PubMed	1 Apr 2023	1,549	21
2	MEDLINE	5 Apr 2023	454	6
3	Embase	10 Apr 2023	398	0
4	Scopus	15 Apr 2023	270	0
5	Web of Science	17 Apr 2023	265	0
6	CINHAL	17 Apr 2023	178	0
Total articles			3,114	0

Research Objectives

The objectives of this research were to identify patient-centered care models implementation in hospital settings, to assess the effectiveness of patient-centered care models in improving patient outcomes in hospital settings, and to investigate the impact of prolonged waiting time on healthcare utilization in the ED.

Methods

This systematic review applied the qualitative framework analysis method to define concepts, map the range of phenomena, create typologies, find associations, explore explanations, and develop new ideas to achieve these goals. In the initial stages of this project, we conducted an unstructured literature review to identify any systematic reviews that investigated the review title. But no reviews were then identified. Then we developed a systematic method of identifying problems, which we identified as being the complexity of concepts, contexts, and potential impacts associated with PCC frameworks. The study used the updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement which has been updated to PRISMA 2020, a reporting guideline designed to address the issue of inadequate systematic review reporting [11].

In this study, computerized databases were searched to find related publications, which included PubMed, MEDLINE, Embase, Scopus, Web of Science, and CINHAL between April 1, 2023–April 17, 2023. A manual search of the bibliographies of the indicated publications and necessary material to meet the objectives of this study was conducted.

A combination of Medical Subject Headings (MeSH) terms and keywords related to patient-centered care and ED wait times were used to maximize specificity and sensitivity with these electronic searches were as follows: (MeSH): "Patient-Centered Care," "PCC in Emergency department," "Emergency room," "ED," "ER," "waiting time." This review includes studies published in English between 2013 and 2023 (Table 1).

In order to be included, an article had to be: full text, published in English, peer-reviewed, address the evaluation of the effectiveness of the PCC model in reducing ED wait times, and evaluate the effectiveness of the PCC model in ED. Studies were excluded if they were abstracts, not fully available, published in any language other than English, were not peer-reviewed, did not meet the date of search, and were systematic reviews.

Screening and Data Extraction

Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram is shown in Figure 1 [12]. The search strategy process used the PRISMA flowchart, where a total of three thousand and one hundred fourteen articles were initially found, then duplicated articles were removed and that was followed with an inspection of the titles, abstracts, and executive summaries separately. After that, the remaining abstracts were evaluated by two team members who separately used the inclusion/exclusion criteria, and full texts were acquired when abstracts were insufficient. All the articles that satisfied the predefined inclusion criteria were independently assessed for risk of bias by two independent reviewers. When there were disagreements amongst reviewers, the reasons were determined, and a final conclusion was reached based on a third senior reviewer agreement. Finally, full-text retained references were obtained and appraised against inclusion and exclusion criteria.

Then, the entire text was reviewed, and information was gathered on the context, characteristics of the sample, goals, design, and outcomes. Excel was used to create a form that iteratively extracted all necessary identifiers (online suppl. Table; for all online suppl. material, see https://doi.org/10.1159/000540398). Information on the study's methodology, population, location, country, approach, results, and recommendations, as well as citation details (author names, publication year, title, type of publication). Each study was analyzed for additional data on patient satisfaction, experience measures, waiting times, crowding, LOS, and other outcome measures.

Although each article offers a unique perspective, several key themes emerged from the synthesis of the findings, and each approach was assigned to a primary PCC approach theme, such as patient literacy, quality improvement tools, technology, Emergency Severity Index (ESI) based flow, advanced professionals, and others. After undergoing a data reduction process, interventions that shared a theme were grouped and subdivided into conceptual groups.

Results

Screening and Data Extraction

During the screening process across different databases, a total of one thousand five hundred and forty-nine articles were extracted from PubMed and twenty-one of
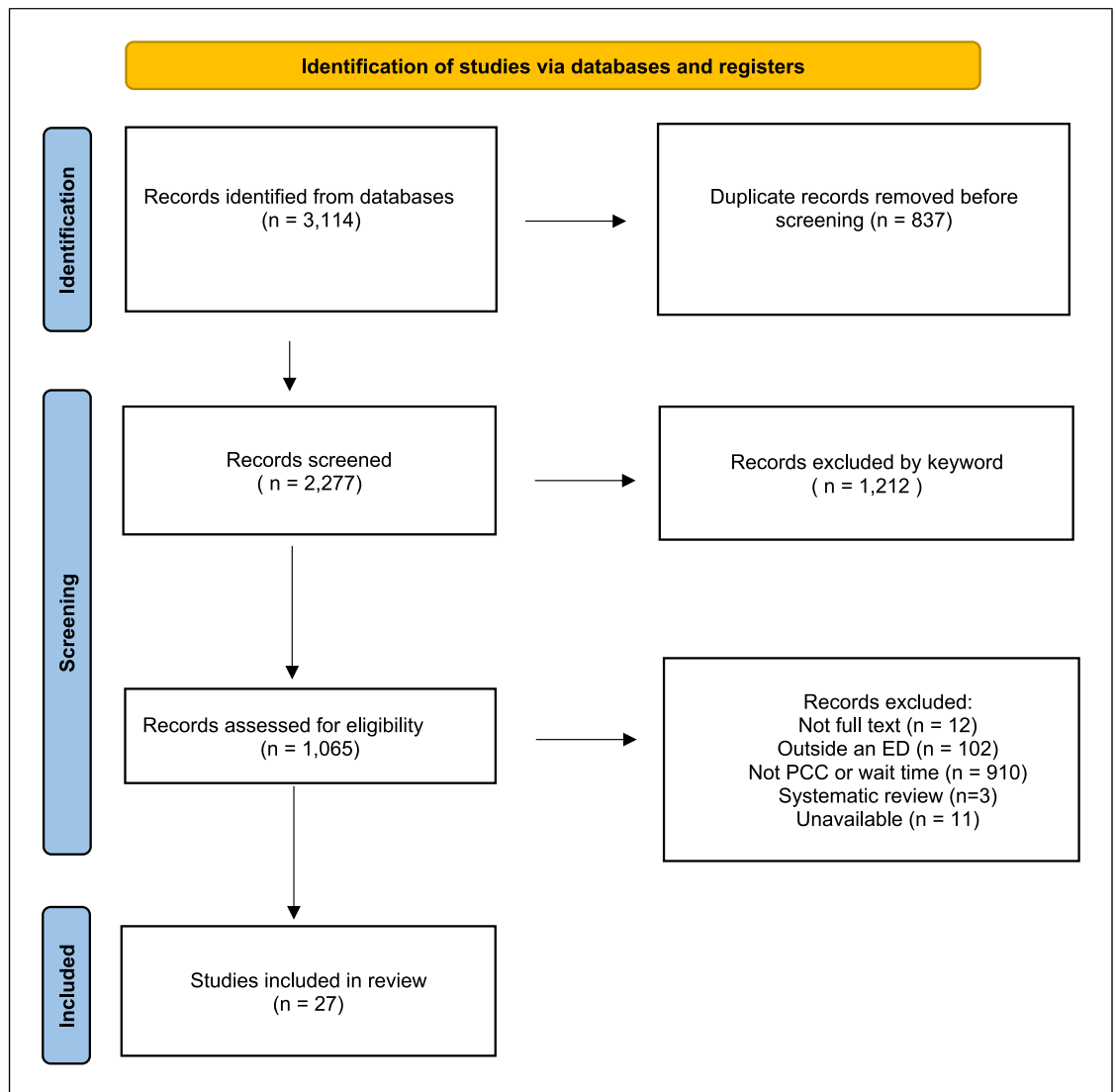
Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

them were included in the current review. From MED-LINE four hundred and fifty-four articles were found but only six were included in the study. Articles found in Embase three hundred and ninety-eight, Scopus two hundred and seventy, Web of Science two hundred and sixty-five, and CINHAL one hundred and seventy-eight, none of them were included in the present quest.

Three thousand and one hundred fourteen studies were imported for screening. Eight hundred thirty-seven duplicate records were removed before the screening process. One thousand two hundred and twelve records were excluded through keywords, one thousand sixty-five were assessed for eligibility in the full-text phase, and twenty-seven studies were included in the data extraction

phase for reviewing. The exclusion criteria were based on many causes, which were no patient-centered care and/or the waiting time (n = 910), the setting was not ED (n = 102), a full-text article was unavailable (n = 12), systematic review (n = 3), and unavailable records (n = 11) (shown in Fig. 1).

The current review used twenty-seven studies of different natures and countries. Coverage of different article types was achieved as possible. Six experimental studies were reviewed, six longitudinal studies, four literature reviews, two observational studies, two mixed methods approach, one of each survey, cross-sectional study, quasi-experimental study, mixed method survey, retrospective analysis, exploratory qualitative, quantitative
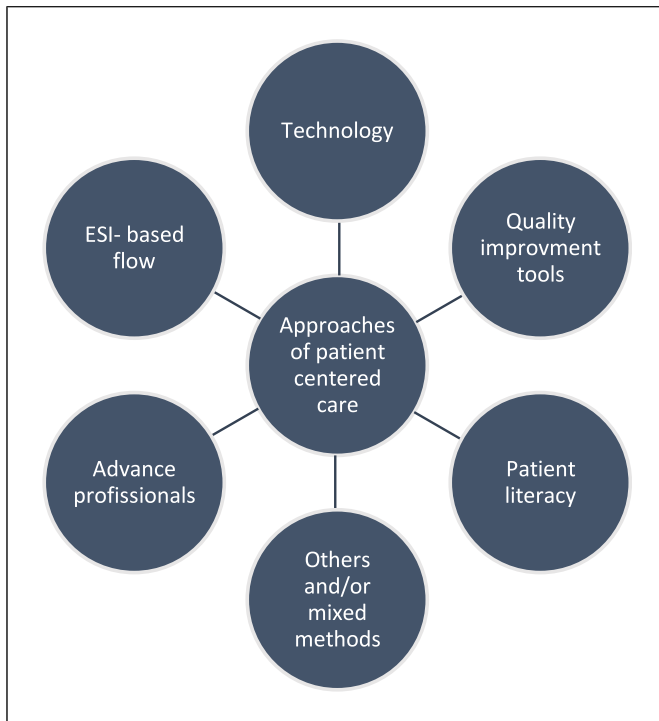
Alhabib/Almutairi/Alqurashi

Fig. 2. Different approaches to patient-centered care.

study, and mixed methods experimental sequential design with integration of findings (online suppl. Table).

A large number of countries were included in the current review, which was the USA (*n* = 8), Canada (*n* = 4), KSA (*n* = 3), and a single study from each of the following: Singapore, India, Israel, Portugal, Tunisia, UAE, China, Australia, Finland, Switzerland, Egypt, and the Netherlands (online suppl. Table). All studies included patient and/or healthcare professional populations with ED experience. Twenty-three studies included populations related to adult ED care, two studies included populations related to pediatric ED care, and two studies related to older patients at ED (online suppl. Table).

Interventions Were Taken to Achieve Patient-Centered Care as Currently Reviewed in the Literature
In all articles that have been reviewed in the current review (shown in Fig. 2), interventions taken to achieve patient-centered care can be categorized into six different approaches defined below.

Patient Literacy
According to a recent study, a notable portion of patients are unfamiliar with the triage system and unaware of the reasons why some patients are prioritized over others

in the emergency room, even if they have been waiting for a shorter time. Additionally, most patients prefer to receive regular updates on delays, often requesting updates every half-hour. Furthermore, a significant number of patients lack a designated primary care physician, underscoring the critical role of primary health care (PHC) in enhancing overall community health and mitigating mortality and health disparities [13, 14].

Quality Improvement Tools
Lean Six Sigma is a management philosophy that combines Lean Manufacturing and Six Sigma strategies to enhance patient care by decreasing medical errors, reducing waste and waiting time, and improving satisfaction levels in the health sector. According to Al-Zuheri et al. [15], its application has shown a positive impact on patient satisfaction levels.

To improve patient experience scores in pediatric emergency care, a multidisciplinary team consisting of pediatric emergency medicine nurses, physicians, and hospital quality improvement personnel was assembled. The interventions included rounding in the waiting and examination rooms, staff training, team huddles, and the formation of a cross-department committee.

The sub-scores of interest included physician performance, activities for patients to perform in the waiting room, waiting time for radiology, staff sensitivity, and communication about delays. Over 6 months, the overall patient experience score significantly improved from 86.1 to 89.8, as reported by Emerson et al. [16].

Additionally, Hammoudeh et al. [17] conducted a pre-and post-lean design study to evaluate the effectiveness of a Lean technique alone or combined with the Priority Admission Triage (PAT) program to reduce the admission waiting time of the emergency medical ward. The interventions included a structured re-design process, enhanced communication with the medical department, a new high-sensitivity troponin-T (hsTnT) blood test, and the implementation of the PAT program. The results showed significant reductions in triage waiting time, end waiting time for consultation, and admission waiting time of Emergency Medical Ward. The study concluded that lean management and the PAT program improved patient flow in the ED, enhancing high-quality emergency care and patient satisfaction.

Furthermore, Saleh et al. [18] employed Quality Function Deployment, a Six Sigma design, to reduce the average waiting time for all types of ED patients. The study found that guidelines and standards were dominant factors that should be considered to reduce the waiting time. One way to employ ED guidelines is to classify patients based on their clinical status.

To reduce the wait time to triage, Yuzeng and Hui [14] conducted a study to determine the effectiveness of implementing a series of Plan, Do, Study, Act (PDSA) cycles within 1 year. The interventions included refining triage criteria, forming a triage nurse clinician role, conducting a needs analysis of required nursing manpower, and eyeball triage by senior nurses to facilitate direct bedding of patients [14]. The study showed a 28% reduction in the wait time to triage from a baseline duration of 18 min to a post-implementation period of 13 min.

Technology

The implementation of a stochastic mixed-integer linear programming (MILP) model is effective in improving patient flow and increasing patient satisfaction by significantly reducing the average total patient waiting time from patient arrival in the ED until hospitalization. The model considers time constraints and efficient planning of the limited available resources to ensure that the system's demands are met. Specifically, the model focuses on optimizing 6 main patient queues or activities in the ED, namely triage, general assessment, surgical assessment, auxiliary examinations, life-threatening emergencies (SAUV), and bed assignment. The proposed approach has been demonstrated to successfully reduce the average patient waiting time [19].

Artificial intelligence (AI) has also been employed to enhance hospital operational efficiency, particularly in EDs, resulting in a reduction of the average LOS by 15% when employing the genetic algorithm (GA). Predictive AI models have been utilized in predicting patient inflow into EDs, readmissions into EDs, disease or other outcomes, and in-patient mortality, which can optimize hospital resources and increase patient satisfaction through patient monitoring. Specifically, the prediction of waiting times and appointment delays is particularly useful in achieving these goals [20].

Furthermore, the implementation of AI and Natural Language Processing in the Firstpass technique has facilitated innovative patient flow and feedback modules. Firstpass is a software technology platform that enables hospitals to measure patient experience covering both in-patient and out-patient, enabling providers to take corrective and preventive remedies. This platform unlocks real-time patient data insights, including wait times, care time, and transit time, and provides providers with a view of the facility's situation, including the department's patient crowd, understaffed areas, and utilization of overstaffed areas [21].

Furthermore, a systematic review was conducted by performing a comprehensive search of bibliographic databases, which included 19 articles. The review identified five categories of proposed strategies for improving patient flow and overcrowding in EDs: work organization, investment in primary care, creation of new dedicated professional figures, work, structural modifications, and implementation of predictive simulation models using mathematical algorithms. The most effective measures to improve the flow of patients were found to be improving the efficiency of human resources and developing predictive mathematical models [22]. However, to enhance the patient experience in pediatric EDs, a mobile health (mHealth) app called Info Kids was developed based on patient-centered care principles. An evaluation of the app's usability was conducted by potential end-users, and the results showed good effectiveness and overall good to excellent perceived usability. However, an ergonomic evaluation identified 14 usability problems that need improvement [23].

Developing a system called myED provided patients with real-time, dynamic, and updated information about their ED medical journey, including specific procedures and expected waiting times. Patients could access this information on their mobile phones through a responsive website, and their understanding of the ED journey improved significantly after using the system. This helped address patients' psychological needs for information and understanding, which is often overlooked [24].

Point of care testing (POCT) was studied as a tool to reduce the LOS in ED non-ambulatory patients. The results showed that POCT shortened the laboratory process, reduced waiting time for blood sampling, and allowed patients to be discharged home quicker than central laboratory testing. With proper training and education of the ED care team, POCT can be an effective tool for improving patient flow [25].

Emergency Severity Index-Based Flow

Split Flow and PCC. Split flow by an intake attending physician with numerous internal waiting spaces can provide significant benefits. LOS dropped by 54 min, and D2P decreased by 16.6 min compared to a conventional ED with ESI-based flow and a single waiting room, as shown by a DES simulation of a single ED.

A 2-factor analysis study design examined the interaction of 3 flow models (split by Emergency Severity Index score, split by a physician, and no split) with three sub-waiting area types (no sub-waiting, one sub-waiting, and two sub-waiting). This decreased LOS by 54 min, and D2P was reduced by 16.6 min compared to

a conventional ED with ESI-based flow and a single waiting room. ED flow and physical design modifications have significant potential to improve operational and patient-centered metrics. Adding sub-waiting areas and using a physician to split flow, as opposed to ESI score sorting, significantly improved operational and patient-centered metrics [26].

Advance Professionals

Hourly rounding has been found to positively impact patient satisfaction in the ED setting. In a trial to increase patient satisfaction scores, nursing staff actively provided frequent updates to patients. This intervention resulted in an increase in overall patient satisfaction from 52 to 73%, an increase in perception of staff attitude from 70 to 84%, and an increase in the percentage of patients who felt their questions and concerns were addressed by the healthcare team from 63 to 81% [27]. To further improve patient flow and satisfaction, some EDs have introduced a specific nursing role for patients in the waiting room. This has resulted in better communication and improved patient safety, ultimately leading to more patient-centered care [28].

Others and/or Mixed Methods

Individualized Care Plans and Care Transition Interventions to Deal with Patients Suffering Chronic Pain so Targeting ED and How This Raises the Crowdedness of ED. An exploratory qualitative study design was used to explore the reasons for those frequenting the ED to treat chronic pain, as their rate is about 42% of all ED visits. Four themes emerged from the qualitative data analysis: time of day, pain intensity, barriers to and reasons for using the ED for care, and lack of an individualized care plan [29].

The Qualitative Patient Journey Method for Older Patients and How It Affects Their ED Experience. The perspective and experience of older patients are critical to consider in ED, and this can be achieved via the qualitative patient journey method. This method included the patient's voice in many issues like waiting time and hospital discharge instructions. Health status, social system, contact with the general practitioner, aftercare, discharge, and expectations were the five main themes in the study. The two significant findings were that lack of clarity regarding waiting times and suboptimal discharge communication contributed to negative experiences. Recommendations regarding waiting time (i.e., a 2-h time out at the ED) and discharge communication (i.e., checklist for discharge) could contribute to a positive ED experience and thereby potentially improve patient-centered care [30].

SurgeCon (Pragmatic, ED Management Platform). SurgeCon is a pragmatic ED management platform that includes a series of interventions that improve ED efficiency and patient satisfaction. The Canadian ED provides timely emergency care and improves ED patient flow in the rural context. This was achieved in a rural community hospital ED over 45 months. The intervention involved Lean training, fast-track implementation, a patient-centeredness approach, a door-to-doctor approach, performance reporting, and an action-based surge capacity protocol. There was a significant decrease in physician initial assessment time, LOS for departed patients, and left without being seen [31].

Discussion

The hospital is a complex community facing challenges related to medical and economic barriers due to increased service demand, high costs, limited budget, and healthcare resources [19]. The ED crowd affects patients greatly and makes them wait for a long time to be examined by health care members, which passively affects overall patient satisfaction levels and gives them a bad impression of health care service [19].

Long waiting times in ED can be life-threatening as sometimes one minute means a lot in an urgent case in ED [15]. One major factor behind the long waiting times in ED is the steadily increasing visits worldwide, which may be related to many causes like the aging of the population, limited access to medical care from other resources, and high rate of use of ED for nonemergency care [19].

Identification of a PCC Model Implementation in a Hospital Setting

The health care decisions and actions are all targeted toward patient benefits, needs as well as satisfaction, which is termed patient-centered care (PCC) [32]. Patient-centered care can exert a very impressive role contribution to EDs [6]. Patients should receive integrated care that addresses their clinical, emotional, financial, and psychological needs.

Factors such as the healthcare system's mission, leadership, and quality improvement impact patient-centered care [32]. In addition, enhanced communication between healthcare providers and patients, education of the staff, and involvement of the patient/family in information sharing and decision-making makes them feel comfortable, respected, and trusted [6]. Moreover, patient and family preferences, cultures, and socioeconomic conditions should be taken into consideration [32].

To improve patients' experience in the ED, interventions targeting long waiting times were reviewed. Reducing wait times can help alleviate overcrowding. Healthcare institutions use different methods and tools to improve performance and quality [15].

Among the key elements affecting patient satisfaction levels in the ED waiting room was increased knowledge of triage systems [13, 14], which comes in agreement with a study documented by Shah et al. [33]. In addition to the provision of information about health education topics during the waiting time, which is consistent with Penry Williams et al [34]. Moreover, information on how the ED operates is delivered through a video in the waiting room, and educational videos during ED visits were also associated with increased patient satisfaction [34].

In addition, it was reported that the availability of primary health care (PHC) helped a lot in decreasing the flow of patients towards ED which decreased crowdedness in ED and hence decreased the waiting time as well [13, 14]. In line with these results, there was a recent study that reported that placing primary care staff in the ED to triage patients significantly reduced waiting time in the ED or time to return home.

In Saudi Arabia, primary healthcare (PHC) was neglected, leading to overcrowding in EDs. To address this, the KSA government introduced the 2030 vision, which aims to promote the use of PHC as a first point of contact by expanding family medicine residency programs across the country [13].

Effectiveness of the PCC Model in Improving Patient Outcomes in the Hospital Setting

It was found that median LOS, door-to-doctor time, number of left without being seen patients, Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) top box %, and Yelp overall rating were improved after the intervention of the lean technique. In turn, this greatly facilitated ED throughput for admissions and increased bed availability [35]. This is in line with a review article that reported that the Lean Six Sigma approach significantly decreased patients' waiting time, hence raising their satisfaction level [15].

To establish a suitable and perennial environment for Lean application, continuous improvement should be done [36, 37] and training on lean techniques should be applied to all team members while encouraging them to propose and implement ideas for problem-solving [38]. Moreover, continuous and efficient communication also helps in spreading this culture [39]. Although Lean succeeded in overcoming some challenges in ED such as waiting time and LOS in hospitals [40], some solutions to improve patient flow management were disrupted by the lack of managers' engagement and teams in project implementation [41].

The American Academy of Pediatrics, American College of Emergency Physicians, and the Institute of Medicine endorsed that understanding and enhancing patients' experiences in the pediatric ED is an essential dimension of providing high-level patient and family-centered care. Rochat et al. [23] reported that using the mobile app was documented to aid in supporting patients in pediatric settings who are suffering from long waiting times in ED, which increased their satisfaction level.

Similar to other health information technologies, the benefits of apps can only be achieved if end users intend to adopt them [42]. Although usability has been identified as a key component of good practice in the development of digital apps [43], only a small fraction of medical apps published their usability evaluation results, despite their growing number [44].

One other important arm of ED crowding is the increasing number of older people with complex medical and social situations who visit the ED [45]. As declared by Schouten et al. [30], older patients globally account for up to 30% of all ED visits, and this proportion will continue to increase. In addition, up to 22% of older patients who visit the ED were reported to have a return visit within 30 days. Older patient perspectives and strive were involved to achieve PCC at the ED. Furthermore, it was documented that the two most apparent issues with older patients' experience were the waiting time and discharge communication, which was in line with many other studies on patient experiences at the ED as described in literature reviews [46]. In agreement also with our study, a recent study illustrated that older patients denoted many themes in the ED which include prompt triage, seamless, fast, and efficient services, and preferences for a segregated ED with separate services for older patients [47].

Studies have shown that perceived waiting times and not being informed about the waiting times have a larger impact on patient experience and satisfaction than objective waiting times which indicates that clear communication to make sure that patients do not feel like they are forgotten and excluded, is very critical to their satisfaction. Patients judged that the return visit reason mostly was related to the initial visit reason as well. Some patients reported negative experiences in the form of insufficient discharge instructions and/or aftercare. Based on this, it critically suggested that some patients might have not received optimal ED care during the initial visit [30]. Worth mentioning that about 30%–40% of ED return visits could be prevented with appropriate and adequate discharge instructions and aftercare [48].

The Impact of Prolonged Waiting Time on Healthcare Utilization in the ED

Long waiting times resulted in many adverse events for patients such as delayed access to treatments [49] which resulted in their dissatisfaction [50], poorer clinical outcomes [51, 52], with increased costs [53]. In addition, a feeling of inequality occurs among patients [51, 54] which consequently raise the patient's anxiety [55].

For patients with chronic health conditions, there may be a cumulative burden from waiting time so they may spend more time out of the workforce, hence worsening their socioeconomic levels. Based on this, there will be a higher disease burden that increases healthcare resource utilization [56].

Conclusively, the findings of this review are constrained by the quality of data reported in the retrieved studies, as well as the limited evidence available. In some quantitative articles, there was a lack of effect sizes or significance levels, which prevented us from providing this information. The absence of quantitative evidence also precluded us from conducting a meta-analysis to strengthen our results. It is possible that opposing evidence was not available due to publication bias, as articles aligned with current evidence are more likely to be published. Additionally, our search was limited to peer-reviewed articles in English, potentially resulting in the exclusion of articles in other languages or non-peer-reviewed sources. Furthermore, the inclusion of studies with small sample sizes may limit the generalizability of the findings to other populations. In the future, more quantitative evidence is needed to gain a better understanding of the impact of PCC on patient outcomes. As new information becomes available regarding PCC and waiting time in the ED, the strength of the evidence produced by this review should be reevaluated.

Conclusion

Patient-centered care is a holistic approach to forming a trusting relationship between patients and care providers; this is achieved via providing care that includes patient involvement, communication, well-trained staff, and meeting all patients' psychosocial, physical, emotional, medical, social, cognitive, and cultural needs. To reach a well-organized and successful PCC many axes should be targeted at the same time, like improvements to healthcare providers and increasing their qualifications along with dealing with patient needs to shorten the process rather than application of one thing alone.

Developing new techniques and coping with advances in technology have a very impressive effect on patient

satisfaction like developing a mobile app that targets their appointments in the hospital ED and contains all their data. The role of artificial intelligence cannot be ignored in the setting of PCC as when it is applied it reduces the average length of stay and helps in predicting the waiting time and appointment delays which optimize hospital resources and increase patient satisfaction via patient monitoring. As a result of the application of patient-centered care in the ED, waiting times are reduced greatly.

Limitations

The reported results did not include quantitative findings due to the nature of the objectives of this review that dictated using the qualitative framework analysis method with the included papers. In addition, our search was limited to peer-reviewed articles in English, potentially resulting in the exclusion of articles in other languages or non-peer-reviewed sources.

Statement of Ethics

Statement of Ethics is not applicable because this study is based exclusively on published literature.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Author Contributions

Anoud Alhabib, Maram Almutairi, and Heba Alqurashi agreed on the topic of research and decided on the research aim and goals. Anoud Alhabib and Maram Almutairi collected the data, the analysis was done by Anoud Alhabib, Maram Almutairi, and Heba Alqurashi. Anoud Alhabib, Maram Almutairi, and Heba Alqurashi prepared the manuscript and approved the final Version.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material. Further inquiries can be directed to the corresponding author.

References

1 Paling S, Lambert J, Clouting J, González-Esquerré J, Auterson T. Waiting times in emergency departments: exploring the factors associated with longer patient waits for emergency care in England using routinely collected daily data. Emerg Med J. 2020;37(12):781–6. https://doi.org/10.1136/emermed-2019-208849

2 Ahsan KB, Alam MR, Morel DG, Karim MA. Emergency department resource optimisation for improved performance: a review. J Ind Eng Int. 2019;15(S1):253–66. https://doi.org/10.1007/s40092-019-00335-x

3 Kelley DP, Gravina N. Every minute counts: using process improvement and performance feedback to improve patient flow in an emergency department. J Organ Behav Manage. 2018;38(2–3):234–43. https://doi.org/10.1080/01608061.2017.1423150

4 Kusumawati HI, Magarey J, Rasmussen P. Analysis of factors influencing length of stay in the Emergency Department in public hospital, Yogyakarta, Indonesia. Australas Emerg Care. 2019;22(3):174–9. https://doi.org/10.1016/j.auec.2019.06.001

5 Beczek A, Vámosi M. Prevalence of prolonged length of stay in an emergency department in urban Denmark: a retrospective health records repository review. J Emerg Nurs. 2022;48(1):102.e1–12. https://doi.org/10.1016/j.jen.2021.08.005

6 Walsh A, Bodaghkhani E, Etchegary H, Alcock L, Patey C, Senior D, et al. Patient-centered care in the emergency department: a systematic review and meta-ethnographic synthesis. Int J Emerg Med. 2022;15(1):36. https://doi.org/10.1186/s12245-022-00438-0

7 Ortíz-Barrios MA, Alfaro-Saíz JJ. Methodological approaches to support process improvement in emergency departments: a systematic review. Int J Environ Res Public Health. 2020;17(8):2664. https://doi.org/10.3390/ijerph17082664

8 Kuipers SJ, Cramm JM, Nieboer AP. The importance of patient-centered care and co-creation of care for satisfaction with care and physical and social well-being of patients with multi-morbidity in the primary care setting. BMC Health Serv Res. 2019;19(1):13. https://doi.org/10.1186/s12913-018-3818-y

9 Pham JC, Trueger NS, Hilton J, Khare RK, Smith JP, Bernstein SL. Interventions to improve patient-centered care during times of emergency department crowding. Acad Emerg Med. 2011;18(12):1289–94. https://doi.org/10.1111/j.1553-2712.2011.01224.x

10 Jensen AN, Andersen O, Gamst-Jensen H, Kristiansen M. Short communication: opportunities and challenges for early person-centered care for older patients in emergency settings. Int J Environ Res Public Health. 2021;18(23):12526. https://doi.org/10.3390/ijerph182312526

11 Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. BMJ. 2021;372:n160. https://doi.org/10.1136/bmj.n160

12 Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JPA, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. PLOS Med. 2009;6(7):e1000100. https://doi.org/10.1371/journal.pmed.1000100

13 Alhabdan N, Alhusain F, Alharbi A, Alsadhan M, Hakami M, Masuadi E. Exploring emergency department visits: factors influencing individuals' decisions, knowledge of triage systems and waiting times, and experiences during visits to a tertiary hospital in Saudi Arabia. Int J Emerg Med. 2019;12(1):35. https://doi.org/10.1186/s12245-019-0254-7

14 Yuzeng S, Hui LL. Improving the wait time to triage at the emergency department. BMJ Open Qual. 2020;9(1):e000708. https://doi.org/10.1136/bmjoq-2019-000708

15 Al-Zuheri A, Vlachos I, Amer Y. Application of lean six sigma to reduce patient waiting time: literature review. Int J Qual Res. 2021;15(1):241–58. https://doi.org/10.24874/IJQR15.01-14

16 Emerson BL, Setzer E, Bechtel K, Grossman M. Improving patient experience scores in a pediatric emergency department. Pediatr Qual Saf. 2021;6(4):e417. https://doi.org/10.1097/pq9.0000000000000417

17 Hammoudeh S, Amireh A, Jaddoua S, Nazer L, Jazairy E, Al-Dewiri R. The impact of lean management implementation on waiting time and satisfaction of patients and staff at an outpatient pharmacy of a comprehensive cancer center in Jordan. Hosp Pharm. 2021;56(6):737–44. https://doi.org/10.1177/0018578720954147

18 Saleh N, Adel H, Wahed M. Quality-driven framework for reducing patient waiting time in emergency department. J Eng Res. 2021;9(1). https://doi.org/10.36909/jer.v9i1.8789

19 Daldoul D, Nouaouri I, Bouchriha H, Allaoui H. A stochastic model to minimize patient waiting time in an emergency department. Oper Res Health Care. 2018;18:16–25. https://doi.org/10.1016/j.orhc.2018.01.008

20 Ellahham S, Ellahham N. Use of artificial intelligence for improving patient flow and healthcare delivery. J Comput Sci Syst Biol. 2019;12:1–6.

21 Ramdurai B. Improving patient experience with firstpass-unified patient experience & engagement platform Balagopal Ramdurai. Am J Intell Syst. 2022. https://doi.org/10.5923/j.ajis.20221201.01

22 Maninchedda M, Proia AS, Bianco L, Aromatario M, Orsi GB, Napoli C. Main features and control strategies to reduce overcrowding in emergency departments: a systematic review of the literature. Risk Manag Healthc Pol. 2023;16:255–66. https://doi.org/10.2147/RMHP.S399045

23 Rochat J, Ehrler F, Siebert JN, Ricci A, Garretas Ruiz V, Lovis C. Usability testing of a patient-centered mobile health app for supporting and guiding the pediatric emergency department patient journey: mixed methods study. JMIR Pediatr Parent. 2022;5(1):e25540. https://doi.org/10.2196/25540

24 Westphal M, Yom-Tov GB, Parush A, Carmeli N, Shaulov A, Shapira C, et al. A patient-centered information system (myED) for emergency care journeys: design, development, and initial adoption. JMIR Form Res. 2020;4(2):e16410. https://doi.org/10.2196/16410

25 Kankaanpää M, Holma-Eriksson M, Kapanen S, Heitto M, Bergström S, Muukkonen L, et al. Comparison of the use of comprehensive point-of-care test panel to conventional laboratory process in emergency department. BMC Emerg Med. 2018;18(1):43. https://doi.org/10.1186/s12873-018-0198-x

26 Easter B, Houshiarian N, Pati D, Lennon J, Wiler J. 49EMF designing emergency departments to provide efficient, patient-centered care: an analysis of split flow and sub-waiting area models. Ann Emerg Med. 2017;70(4):S20. https://doi.org/10.1016/j.annemergmed.2017.07.073

27 Brosinski C, Riddell A. Incorporating hourly rounding to increase emergency department patient satisfaction: a quality improvement approach. J Emerg Nurs. 2020;46(4):511–7. https://doi.org/10.1016/j.jen.2019.08.004

28 Innes K, Jackson D, Plummer V, Elliott D. Exploration and model development for emergency department waiting room nurse role: synthesis of a three-phase sequential mixed methods study. Int Emerg Nurs. 2021;59:101075. https://doi.org/10.1016/j.ienj.2021.101075

29 Jambunathan J, Chappy S, Siebers JJ, Deda A. Patient-centered care for chronic pain in the emergency department: a qualitative study. Int Emerg Nurs. 2016;24:22–7. https://doi.org/10.1016/j.ienj.2015.05.005

30 Schouten B, Driesen BEJM, Merten H, Burger BHCM, Hartjes MG, Nanayakkara PWB, et al. Experiences and perspectives of older patients with a return visit to the emergency department within 30 days: patient journey mapping. Eur Geriatr Med. 2022;13(2):339–50. https://doi.org/10.1007/s41999-021-00581-6

31 Patey C, Norman P, Araee M, Asghari S, Heeley T, Boyd S, et al. SurgeCon: priming a community emergency department for patient flow management. West J Emerg Med. 2019;20(4):654–65. https://doi.org/10.5811/westjem.2019.5.42027

32 NEJM Catalyst. "What is patient-centered care? NEJM Catalyst". (Online). Available from: https://catalyst.nejm.org/doi/full/10.1056/CAT.17.0559 (accessed May 18, 2023.

33 Shah S, Patel A, Rumoro D, Hohmann S, Fullam F. Managing patient expectations at emergency department triage. Patient Exp J. 2015;2(2):31–44. https://doi.org/10.35680/2372-0247.1090

34 Penry Williams C, Elliott K, Gall J, Woodward-Kron R. Patient and clinician engagement with health information in the primary care waiting room: a mixed methods case study. J Public Health Res. 2019;8(1):1476–25. https://doi.org/10.4081/jphr.2019.1476

35 Cohen PA, Chon J, Hwong R, Chiu CC, Wu MY. Significant reduction of emergency department wait time. Openventio Publishers. (Online). Available from: https://openventio.org/significant-reduction-of-emergency-department-wait-time-correlates-to-improvements-in-patient-satisfaction-and-yelp-ratings/(accessed April 29, 2023).

36 White BA, Chang Y, Grabowski BG, Brown DFM. Using lean-based systems engineering to increase capacity in the emergency department. West J Emerg Med. 2014;15(7): 770–6. https://doi.org/10.5811/westjem.2014.8.21272

37 White BA, Baron JM, Dighe AS, Camargo CA, Brown DFM. Applying Lean methodologies reduces ED laboratory turnaround times. Am J Emerg Med. 2015;33(11):1572–6. https://doi.org/10.1016/j.ajem.2015.06.013

38 Mazzocato P, Stenfors-Hayes T, von Thiele Schwarz U, Hasson H, Nyström ME. Kaizen practice in healthcare: a qualitative analysis of hospital employees' suggestions for improvement. BMJ Open. 2016;6(7):e012256. https://doi.org/10.1136/bmjopen-2016-012256

39 Rotteau L, Webster F, Salkeld E, Hellings C, Guttmann A, Vermeulen MJ, et al. Ontario's emergency department process improvement program: the experience of implementation. Acad Emerg Med. 2015;22(6):720–9. https://doi.org/10.1111/acem.12688

40 Souza DL, Korzenowski AL, Alvarado MM, Sperafico JH, Ackermann AEF, Mareth T, et al. A systematic review on lean applications' in emergency departments. Healthcare. 2021;9(6):763. https://doi.org/10.3390/healthcare9060763

41 Hassanain M. An overview of the performance improvement initiatives by the ministry of health in the Kingdom of Saudi Arabia. Inquiry. 2017;54:0046958017707872. https://doi.org/10.1177/0046958017707872

42 Gordon WJ, Landman A, Zhang H, Bates DW. Beyond validation: getting health apps into clinical practice. NPJ Digit Med.

2020;3:14. https://doi.org/10.1038/s41746-019-0212-z

43 Zapata BC, Fernández-Alemán JL, Idri A, Toval A. Empirical studies on usability of mHealth apps: a systematic literature review. J Med Syst. 2015;39(2):1. https://doi.org/10.1007/s10916-014-0182-2

44 Maramba I, Chatterjee A, Newman C. Methods of usability testing in the development of eHealth applications: a scoping review. Int J Med Inform. 2019; 126:95–104. https://doi.org/10.1016/j.ijmedinf.2019.03.018

45 Morley C, Unwin M, Peterson GM, Stankovich J, Kinsman L. Emergency department crowding: a systematic review of causes, consequences and solutions. PLoS One. 2018;13(8):e0203316. https://doi.org/10.1371/journal.pone.0203316

46 Sonis JD, Aaronson EL, Castagna A, White B. A conceptual model for emergency department patient experience. J Patient Exp. 2019;6(3):173–8. https://doi.org/10.1177/2374373518795415

47 Mwakilasa MT, Foley C, O'Carroll T, Flynn R, Rohde D. Care experiences of older people in the emergency department: a concurrent mixed-methods study. J Patient Exp. 2021;8:23743735211065267. https://doi.org/10.1177/23743735211065267

48 Han C-Y, Chen LC, Barnard A, Lin CC, Hsiao YC, Liu HE, et al. Early revisit to the emergency department: an integrative review. J Emerg Nurs. 2015;41(4):285–95. https://doi.org/10.1016/j.jen.2014.11.013

49 Siciliani L, Moran V, Borowitz M. Measuring and comparing health care waiting times in OECD countries. Health Pol. 2014;118(3): 292–303. https://doi.org/10.1016/j.healthpol.2014.08.011

50 Nottingham Q, Johnson D, Russell R. The effect of waiting time on patient perceptions of care quality. Qual Manag J. 2018;25(1): 32–45. https://doi.org/10.1080/10686967.2018.1404368

51 Moscelli G, Siciliani L, Gutacker N, Cookson R. Socioeconomic inequality of access to healthcare: does choice explain the gradient? J Health Econ. 2018;57:290–314. https://doi.org/10.1016/j.jhealeco.2017.06.005

52 Reichert A, Jacobs R. The impact of waiting time on patient outcomes: evidence from early intervention in psychosis services in England. Health Econ. 2018;27(11):1772–87. https://doi.org/10.1002/hec.3800

53 Ray K, Chari A, Engberg J, Bertolet M, Mehrotra A. Opportunity costs of ambulatory medical care in the United States. Am J Manag Care. 2015;21(8):567–74.

54 Hajizadeh M. Does socioeconomic status affect lengthy wait time in Canada? Evidence

from Canadian Community Health Surveys. Eur J Health Econ. 2018;19(3):369–83. https://doi.org/10.1007/s10198-017-0889-3

55 Lizaur Utrilla A, Martinez-Mendez D, Miralles-Muñoz F, Marco-Gomez L, Lopez-Prats F. Negative impact of waiting time for primary total knee arthroplasty on satisfaction and patient-reported outcome. Int Orthop. 2016;40(11):2303–7. https://doi.org/10.1007/s00264-016-3209-0

56 Pathirana T, Jackson C. Socioeconomic status and multimorbidity: a systematic review and meta-analysis. Aust N Z J Public Health. 2018;42(2):186–94. https://doi.org/10.1111/1753-6405.12762

57 Abdelhadi A. Patients' satisfactions on the waiting period at the emergency units. Comparison study before and during COVID-19 pandemic. J Public Health Res. 2021;10(1):1956. https://doi.org/10.4081/jphr.2021.1956

58 Abidova A, Silva PA, Moreira S. The mediating role of patient satisfaction and perceived quality of healthcare in the emergency department. Medicine. 2021; 100(11):e25133. https://doi.org/10.1097/MD.0000000000025133

59 Calder-Sprackman S, Kwok E, Bradley R, Landreville J, Perry J, Calder L. (2021). Availability of emergency department wait times information: a patient-centered needs assessment. Emerg Med Int. 2021; 2021:8883933. https://doi.org/10.1155/2021/8883933

60 Chan H, Lo S, Lee L, Lo W, Yu W, Wu Y, et al. Lean techniques for the improvement of patients' flow in emergency department. World J Emerg Med. 2014;5(1):24–8. https://doi.org/10.5847/wjem.j.issn.1920-8642.2014.01.004

61 Nyce A, Gandhi S, Freeze B, Bosire J, Ricca T, Kupersmith E, et al. Association of emergency department waiting times with patient experience in admitted and discharged patients. J Patient Exp. 2021;8: 23743735211011404. https://doi.org/10.1177/23743735211011404

62 Rothwell S, McIltrot K, Khouri-Stevens Z. Addressing emergency department issues using advanced practice in Saudi Arabia. J Nurse Pract. 2018;14(2):e41–4. https://doi.org/10.1016/j.nurpra.2017.11.006

63 Sonis JD, White BA. Optimizing patient experience in the emergency department. Emerg Med Clin North Am. 2020;38(3): 705–13. https://doi.org/10.1016/j.emc.2020.04.008

64 Woitas M, Potthoff S, Nelson E, Matticks C. Innovative ED design for patient-centered care. J Emerg Nurs. 2014;40(5):e105–10. https://doi.org/10.1016/j.jen.2013.11.009